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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/582,029	06/07/2006	Mark Edward Huntley	PCT-2006-1	1089

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EXAMINER	
LILLING, HERBERT J	

ART UNIT	PAPER NUMBER
1657	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/582,029	HUNTLEY ET AL.	
	Examiner	Art Unit	
	HERBERT J. LILLING	1657	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 May 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) *14-19* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13 and 20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☒ Claim(s) *14-19* are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *05-15-2009*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

1. Receipt is acknowledged of an amendment and a prior art information disclosure statement filed May 15, 2009.

2. Claims 1-20 are now pending in this application.

Claims 14-19 stand withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to nonelected inventions, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on September 08, 2008.

The restriction requirement has been made **FINAL**.

Claims 1-13 and 20 are drawn to the elected Invention.

3. The rejections based on first and second paragraphs of 35 U.S.C. 112 and the rejection under 35 U.S.C. 103(a) as being unpatentable over Reith et al W0 01/74990 have been withdrawn in view of the persuasive arguments submitted by Applicants.

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 9 and claim 20 are rejected under 35 U.S.C. 112, first paragraph, as based on a disclosure which is not enabling. The claim [independent claim 9] lacks critical or essential material to the practice of the invention, but not included in the claim(s) is not enabled by the disclosure. See *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976).

The requirements for synthesizing oil are completely lacking in the claim.

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ramus, U.S. 4,236,349 or Cysewski et al., 4,417,415 each alone further in view of Reith et al W0 01/74990.

Ramus, U.S. 4,236,349 teaches:

Process and apparatus for the production of algae biopolymer employing a first stage for the growth of algae and a second stage for biopolymer production. In the first stage, growth of algae biomass in a culture medium is accomplished by operating the first stage in a continuous mode in which fresh nitrogen-containing nutrient medium is supplied to the culture. Concomitantly with the supply of fresh nutrient medium to the culture in the first stage, a portion of the culture medium is transferred from the first stage to the second stage in which the supply of nitrogen is limited. A nitrogen deficiency is created in the second stage to shift the culture to a senescent phase to enhance biopolymer production. The growth phase is carried out in a first stage reaction chamber which is connected to a plurality of second stage reaction chambers in parallel with one another. Culture withdrawn from the first stage is transferred sequentially to each of the second stage reaction chambers such that biopolymer production occurs in several second stage chambers simultaneously with cells produced in the first stage reaction chamber

A mixture of air and 5% carbon dioxide was bubbled continuously through the chamber at a rate of 2.2 liters per minute and the culture was maintained at a temperature of 18.degree. C.

In the continuous culture operation simulating the first stage of the present invention, the illumination rate of the incident light energy was adjusted at a level of 2.26 Einsteins per liter per day. Illumination was provided continuously by Sylvania "Cool White" fluorescent lamps. The fresh nutrient medium set forth in Tables I and II was provided to the reaction chamber at the aforementioned dilution rate of 0.3-0.5 dilutions per day and culture medium was withdrawn from the chamber at this same rate to maintain a constant volume. This first stage operation was continued for a period of 8 days. In this stage, the culture was maintained at a concentration of approximately ten million cells per milliliter. **An exponential growth phase was sustained with**

biomass doublings averaging about 0.7 per day and ranging up to 1.5 per day.

The reference is not attached to an open system but to a closed system.

Cysewski et al., 4,417,415 teaches:

During culturing, the alga requires access to both oxygen and carbon dioxide. Accordingly, an oxygen-containing gas containing a minor proportion of carbon dioxide should be passed through the growth medium during culturing. The preferred oxygen-containing gas for this purpose is air containing at least about 3% of carbon dioxide. In the experimental culture vessel already mentioned containing 10 liters of growth medium, this air/carbon dioxide mixture is preferably passed at about 9 liters/minute. Although the initial pH of growth medium should be adjusted within the limits already mentioned, it is not necessary to control the pH during culturing, since the growth of the microalga does not significantly alter the pH.

Detailed Description Text (22):
On day 1 the culture was inoculated and the fermenter illuminated with only 12 of the 24 flourescent tubes. Air, not enriched with carbon dioxide, was passed through the fermenter at a flow rate of 4 l/min. On day 5, the lighting was increased by switching on 18 of the 24 tubes and when, on day 6, the samples indicated that the cell numbers were reaching the end of their exponential growth phase, the lighting was increased to full power, that is to say with all 24 tubes illuminated. On day 6, the cell density was 18.1.times.10.sup.6 cell/ml., thus giving a specific growth rate through day 6 of 0.78 days.sup.-1, representing a doubling time of 15 hours.

The reference is not attached to an open system but to a closed system.

Reith et al W0 01/74990 teaches the processes of cultivating photosynthetic microbes which includes the culturing on an industrial scale, cleaning flue gas and

> "products can be used in nutrition and nutritional supplements, cosmetics and other "personal care" products and in clinical and pharmaceutical

> products. The remainder of the biomass can be designated as animal feed""
> "Important taxonomic groups in the algae world include: green algae, red micro-algae, diatoms, dinofiagellates. Algae cultivation is an environmentally friendly and energetically efficient process for the production of organic material by photosynthesis **from carbon dioxide** and luminous energy.
> In this process, use is made of gratis energy from sunlight, gratis carbon dioxide and water, which can be of low quality, including industrial process water, effluent of biological water treatment or other waste water streams. Products of algae cultivation include algal biomass and purified water which can be used, for example, as industrial water. If the carbon dioxide stems from flue gas, this algae 15 production also contributes to flue gas cleaning, not least because nitrogen compounds..";
>
> which disclosure is within the scope of the claimed subject matter for employing micro-organisms and using carbon dioxide.

Reith indicates both a closed system and open system for the culturing and carrying out the processes with different systems of connecting the closed system with the open system employing various photosynthetic microorganisms as disclosed on page 6 first paragraph:

"The process and the system according to the invention ate suitable for any species or strain from the group of photosynthetic micro-organ/sins. This comprises photo-synthetic bacteria and micro-algae from the order Cyanobacteria (formerly sometimes also referred to as algae order Cyanophyta), the order Chlorophyta (green algae), the order Chromophyta, the order Cryptophyta, the order Pyrrhophyta (dinoflagellates), the order Euglenophyta and the order Rhodophyta (red micro-algae). The Chromophyta, according to this classification, inter alia include the classes Bacillariophyceae (diatoms),Chrysophyceae (golden algae), Eustigmatophyceae and Xanthophyceae (yellow-green algae). According to older classifications, some of these classes form orders of their own (Bacillariophyta, Xanthophym and the like).

Examples are the culture of Monodus species (Eustimatophyceae) for the production of polyunsaturated fatty acids. To be mentioned among these is the species Monodus subterraneus, a freshwater species having an optimum culture temperature of about 25°C and an optimum growth rate (p) of about 0.04 h". Other examples are 15 species and strains from the micro-algae genera Porphyridium sp. (Rhodophyta) for the production of phycobiliproteins and Chlorella sp. (Chlorophyta) for the production of

carotenoids and bioactive substances, and the cyanobacteria genera Nostoc sp., (for the production of phycobiliproteins) and Calothrix sp. (for phycobfliproteins and by-products). “

The reference does not indicate that the micro is capable of doubling in biomass within approximately 16 hours or less but does teach the first step of culturing in a combination of a closed system with an open system, see Figure 2 and the control of the inoculation of the photosynthetic micro-organism from the closed to the open system see page 5 and Figure 1.

It would have been prima facie obvious to one of ordinary skilled in the art to employ the processes of Ramus, U.S. 4,236,349 or Cysewski et al., 4,417,415 for the closed system process of Reith et al to obtain the advantages for increasing the yield of the biomass. Both Ramus and Cysewski et al teach the culturing in the first stage of a closed system to culture photosynthetic microbes in the presence of sufficient carbon dioxide as taught by Ramus which is 5% as required by the claims or by Cysewski et al which is at least about 3% whereby both Ramus and Cysewski et al teaches the same results of increasing the yield of doubling the mass within about 16 hours.

If there are any differences with respect to the claimed subject matter and the general knowledge pertaining to the art in the area, that these differences would have been prima facie obvious to one of ordinary skilled in the pertinent art whether it was based on the art of record or claimed subject would have obvious for the “combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results"; since the reference teaches various micro-organism for culturing algae having a high productivity and biomass by controlling the growth rate by controlling the amount of carbon dioxide and flow from the closed to open systems one would reasonably expect to obtain the same results of increasing the biomass which renders the instant claims obvious absent a showing of unexpected results.

6. **No Claim is allowed.**

7. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to HERBERT J. LILLING whose telephone number is 571-272-0918. The examiner can normally be reached on WORK AT HOME MAXIFLEX.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, JON WEBER can be reached on 571-272-0925. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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Art Unit **1657**
August 11, 2009

/HERBERT J LILLING/
Primary Examiner Art Unit 1657